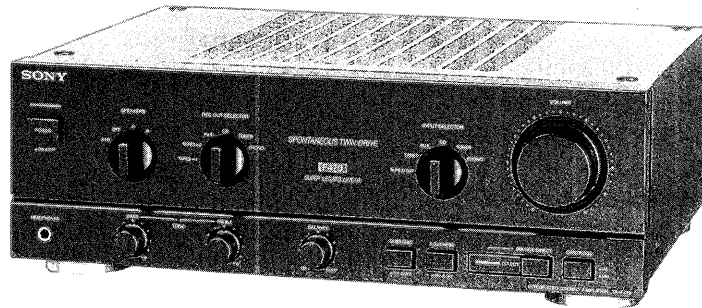


TA-F470

SERVICE MANUAL

*Canadian Model
AEP Model*



SPECIFICATIONS

Amplifier

Continuous RMS power output (both channels driven simultaneously)

		Canadian Model	AEP Model	Germany Model
DIN 1kHz	4 ohms	110W+110W	110W+110W	110W+110W
	6 ohms	—	100W+100W	—
	8 ohms	90W+90W	90W+90W	90W+90W
20Hz–20kHz	4 ohms	—	90W+90W THD 0.02%	90W+90W THD 0.02%
20Hz–20kHz	8 ohms	80W+80W THD 0.008%	80W+80W 0.008%	80W+80W 0.008%

Tone controls

	Response	Turnover frequency
BASS	±10dB (100Hz)	500Hz
TREBLE	±10dB (15kHz)	3kHz

Input

Input jack		Jack type	Sensitivity	Impedance	S/N (weighting network, input level)
PHONO	MM	Phono	2.0mV	50 kilohms	92dB (A, 5mV)
	MC		170 μV	100 ohms	75dB (A, 0.5mV)
TUNER, CD, AUX, TAPE/DAT		Phono	150mV	50 kilohms	100dB (150mV)

Output

Output jack	Jack type	Voltage/impedance
REC OUT	Phono	Voltage 150mV Impedance 1 kohms
SPEAKERS	—	Model for Scandinavian countries, Spain and Portugal Accepts speakers of 6–16 ohms. Models for other countries Accepts speakers of 4–16 ohms.
HEADPHONES	Stereo phone	Accepts low and high impedance headphones.

Loudness (Attenuation 30dB)

+6dB (100Hz) / +3dB (10kHz)

Subsonic filter

6dB/octave, attenuation below 15Hz

Intermodulation (IM) distortion (60Hz : 7kHz=4 : 1)

Less than 0.008% at rated output

Frequency response

PHONO : RIAA equalization curve
±0.5dB

TUNER, CD, AUX, TAPE 1, TAPE 2/
DAT : 7Hz–100kHz±3dB

Residual noise

Less than 170 μV (network A)

Damping factor

70 (8 ohms, 1kHz)

— Continued on page 2 —

INTEGRATED STEREO AMPLIFIER
SONY®

General System

	Preamplifier : Low - noise , high - gain equalizer amplifier
	Power amplifier : Pure-complementary SEPP OCL power amplifier with all stages directly coupled
Power requirements	Canadian Model : 120V AC, 60Hz AEP/Germany Model : 220-230V AC, 50Hz
Power consumption	Canadian Model : 430VA AEP/Germany Model : 210W
Dimensions	Approx. 430×148×372mm (w/h/d) (17×7 $\frac{3}{8}$ ×14 $\frac{3}{4}$ inches)
Weight	Approx. 9.4kg (20 lb 12 oz)

Design and specifications subject to change without notice.

Note

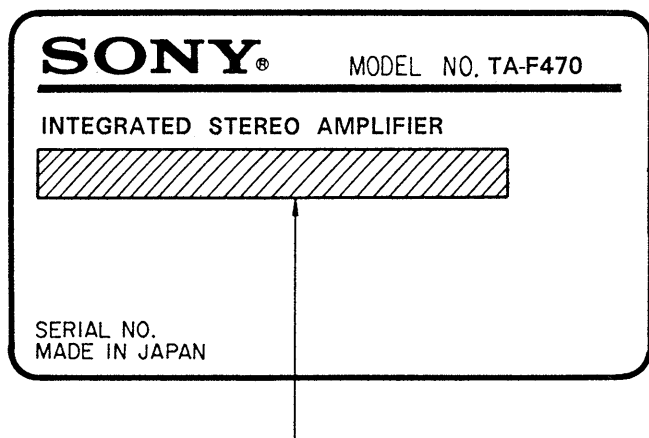
This appliance conforms with EEC directive 87/308/EEC regarding interference suppression.

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
MODEL IDENTIFICATION

—Specification Label—




Canadian model : AC 120V~60Hz
AEP/Germany model : AC 220-230V~50Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  OR DOTTED LINE WITH MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

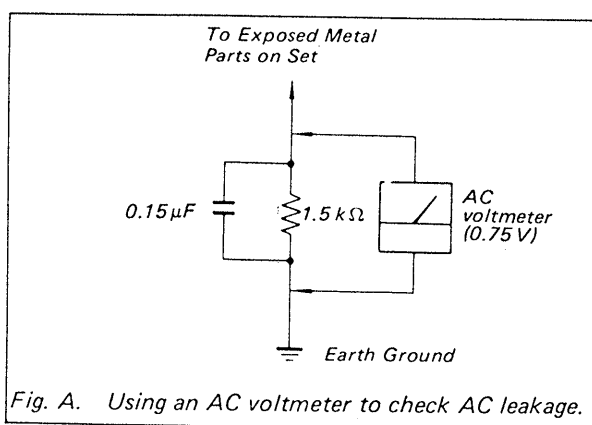


Fig. A. Using an AC voltmeter to check AC leakage.

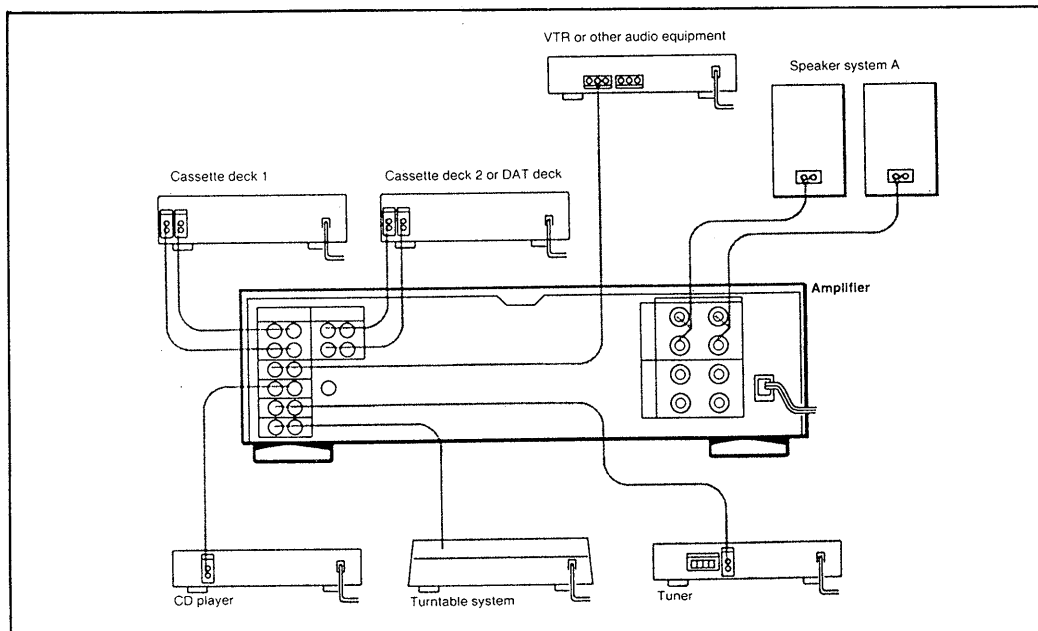
SECTION 1 GENERAL

This section is extracted from instruction manual.

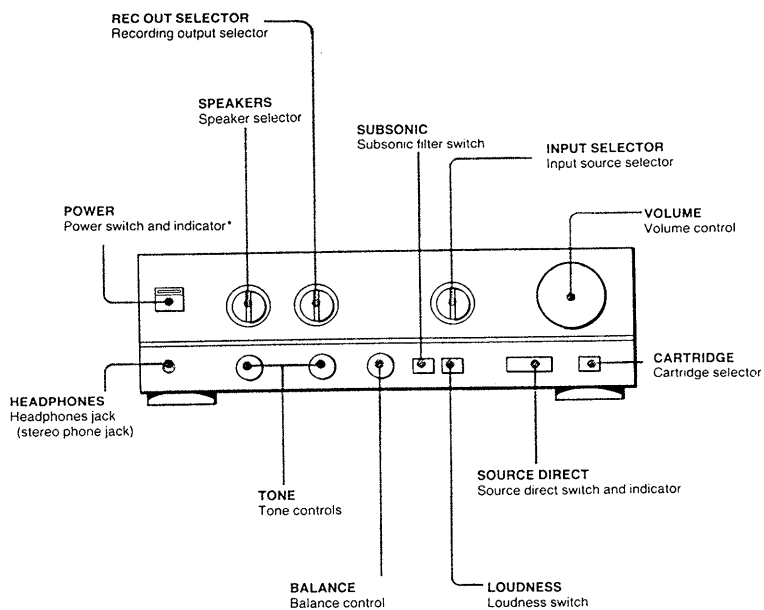
1-1. CONNECTIONS

Notes on Connection

- Connect the AC power cord last. Make sure power is off.
- Cord plugs and jacks are color coded. Red plugs and jacks are for right channel (R) and white ones for left channel (L).
- Fully insert cable connectors into jacks. Loose connections may cause hum or noise.



1-2. PARTS IDENTIFICATION

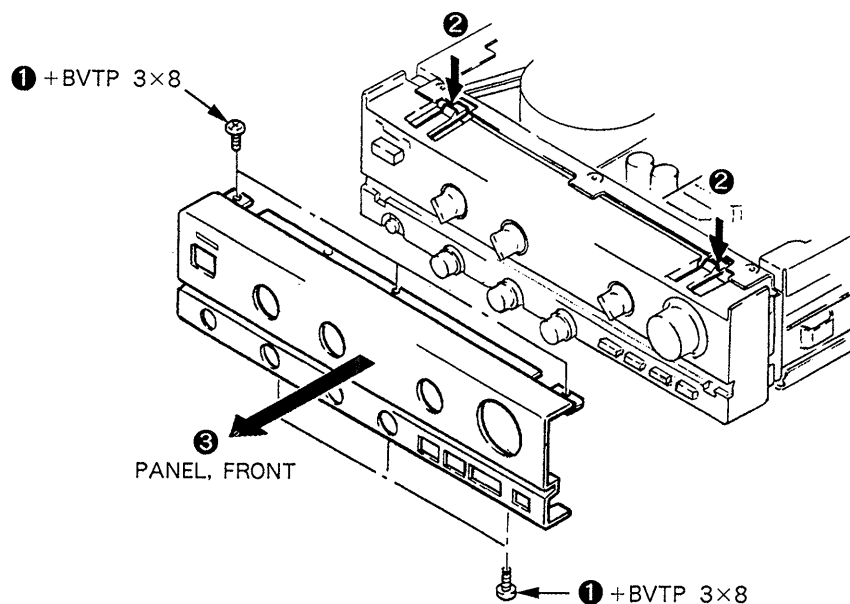


* After the power is turned on, the POWER indicator lights in red and immediately changed to green. If it remains in red, turn off the power, check that speakers and other devices are properly connected, and turn on the power again.

SECTION 2 DISASSEMBLY

Note : Follow the disassembly procedure in the numerical order given.

1. Remove screws ❶ ×6.
2. Push leaves ❷ down to release 2 claws.
3. Pull front panel in the direction of arrow ❸.



SECTION 3 ELECTRICAL ADJUSTMENTS

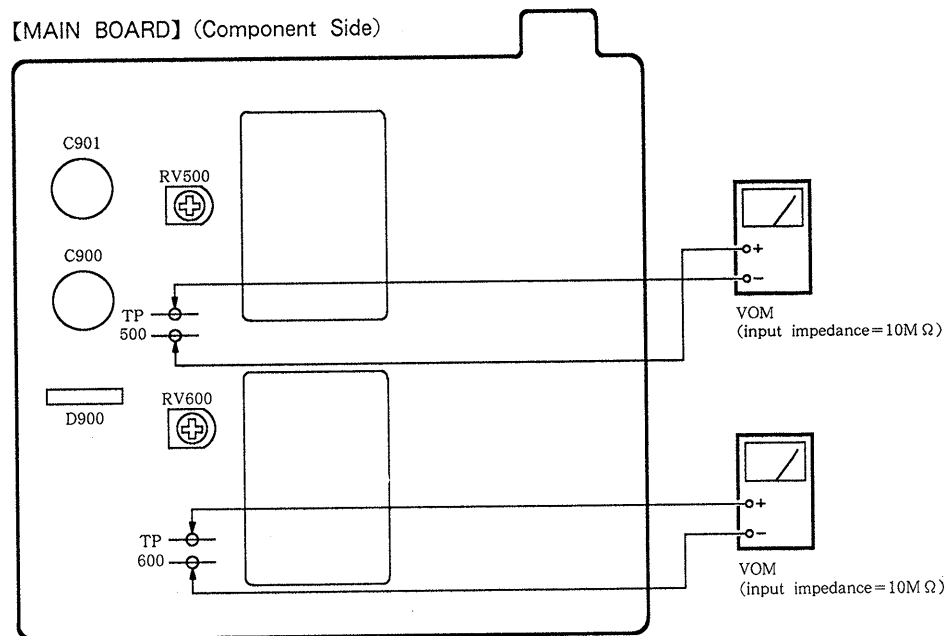
Bias Current Adjustment

Procedure :

1. Set main volume to minimum.
2. Turn the power on and confirm that RY800 will turn on at about 12 seconds after power-on.
3. Adjust RV500 (L-ch) and RV600 (R-ch) so that the voltages across TP500 and TP600 become within the adjustment values.

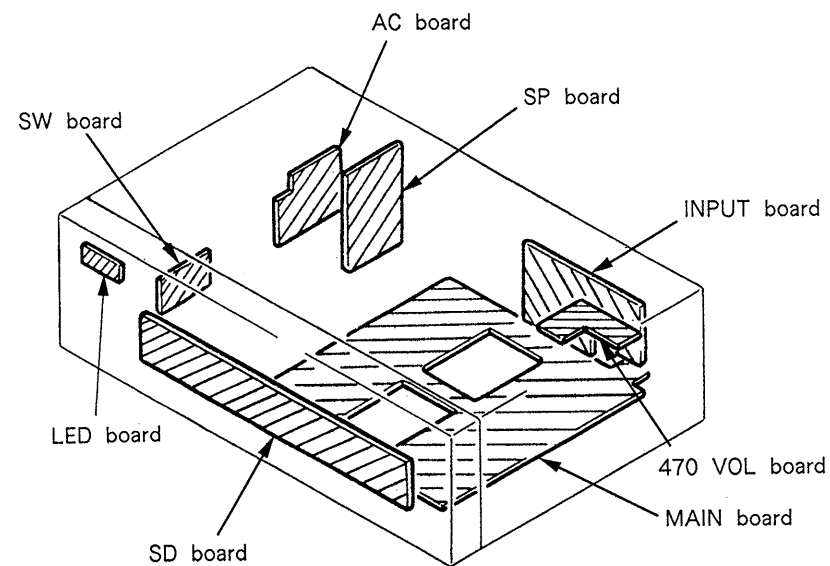
Adjustment Values :

$5\text{mV} \pm 0.3\text{mV}$



SECTION 4 DIAGRAMS

4.1. CIRCUIT BOARDS LOCATION



SEMICONDUCTOR LEAD LAYOUTS

M5218AL
μPC1237HA

TA71815S

TA7915S

DTA124ES
2SC2603-EF

2SA1175-HFE

2SC2545-E
2SA988-FA
2SA1371-E
2SC1841-P
2SC945-P

2SA1684-LK
2SC4431-LK

2SC1941-LK
2SD774-34

2SC2259-FG

2SK246GR

RBV-602-01

SEL2213C-C

SEL2510C-D

SEL2810A-C

1S1585

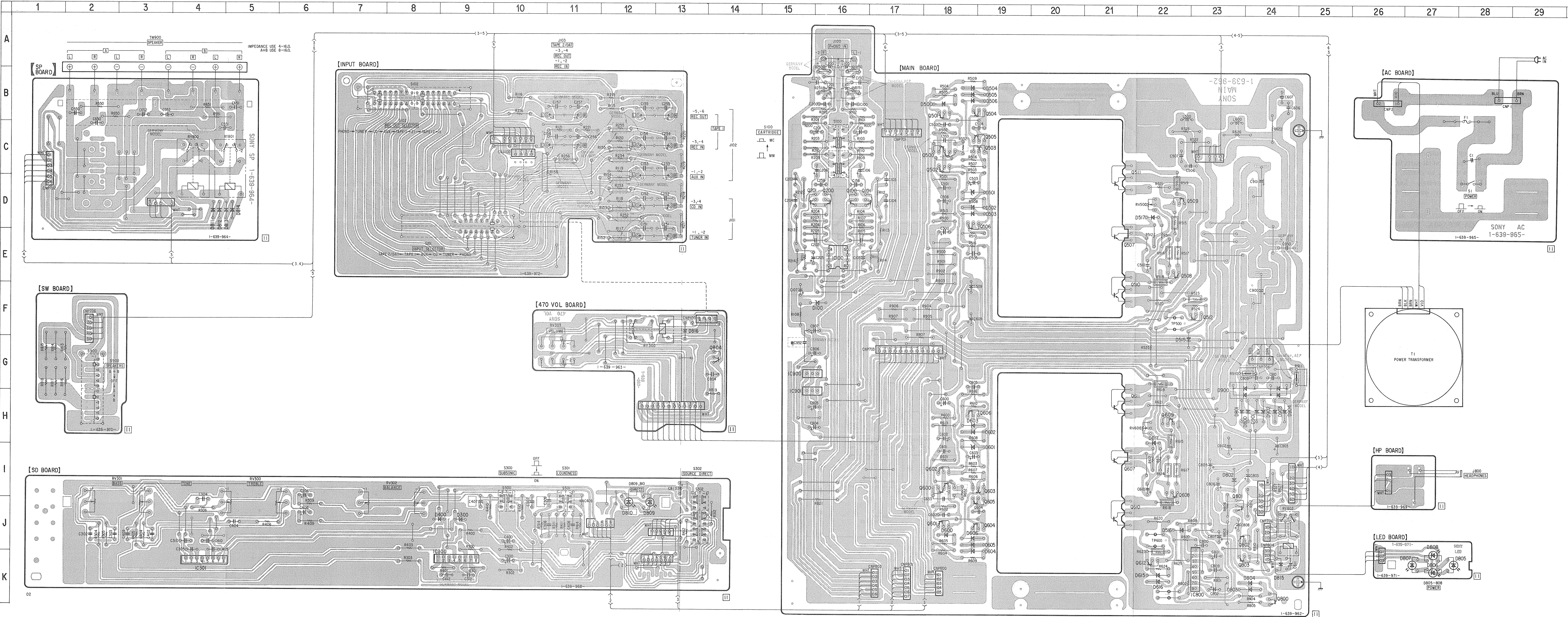
• SEMICONDUCTOR LOCATION

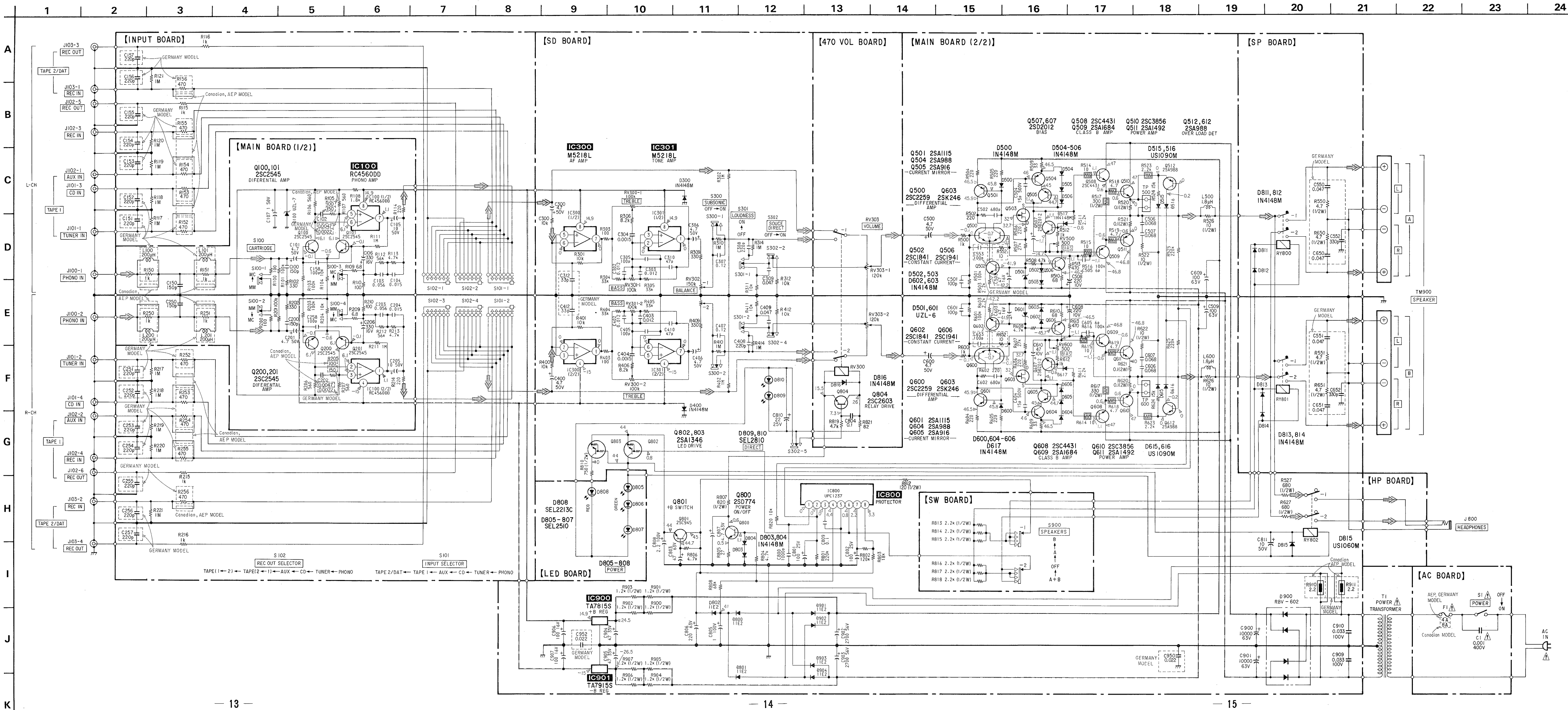
Ref. No.	Location	Ref. No.	Location
D100	F-16	IC100	E-16
D300	J-9	IC300	K-9
D400	J-9	IC301	K-4
D500	B-18	IC800	K-23
D501	D-18	IC900	G-15
		IC901	H-15
D502	D-18		
D503	D-18		
D504	B-18	Q100	D-16
D505	B-18	Q101	D-16
D506	B-18	Q200	D-16
		Q201	D-15
		Q500	C-18
D515	G-23		
D516	J-22		
D517	D-22	Q501	B-18
D600	J-18	Q502	C-18
D601	I-18	Q503	C-19
		Q504	B-19
		Q505	C-19
D602	H-18		
D603	H-18	Q506	D-18
D604	K-18	Q507	E-21
D605	J-18	Q508	E-22
D606	J-18	Q509	D-22
		Q510	F-21
D615	K-22		
D616	K-22		
D617	H-22	Q511	D-21
D800	H-24	Q512	F-23
D801	H-23	Q600	I-18
		Q601	J-18
		Q602	I-18
D802	I-23		
D803	K-24		
D804	K-24	Q603	I-19
D805	K-27	Q604	J-19
D806	K-27	Q605	J-19
		Q606	H-18
		Q607	I-21
D807	K-27		
D808	K-27		
D809	J-12	Q608	I-22
D810	J-12	Q609	H-22
D811	D-4	Q610	J-21
		Q611	H-21
D812	D-4	Q612	K-22
D813	D-5		
D814	D-5	Q800	K-24
D815	K-24	Q801	J-23
D816	F-13	Q802	J-24
		Q803	K-24
		Q804	G-14
D900	G-24		
D901	H-24		
D902	H-24		
D903	H-24		
D904	H-24		

Note :

- : parts extracted from the component side.
- ⦿ : Pattern on the side which is seen.

4-2. PRINTED WIRING BOARDS





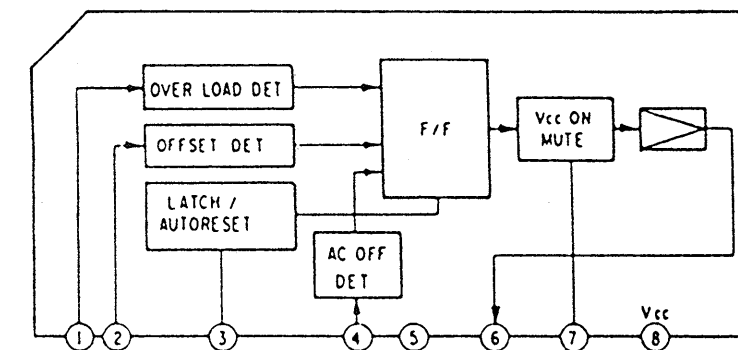
Note:

- All capacitors are in μF unless otherwise noted. pF : μF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and $\frac{1}{4}W$ or less unless otherwise specified.
- : nonflammable resistor.

Note:
The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Note:
Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

IC BLOCK DIAGRAMS

IC800 $\mu PC1237HA$ 



SECTION 5


EXPLODED VIEWS

NOTE:

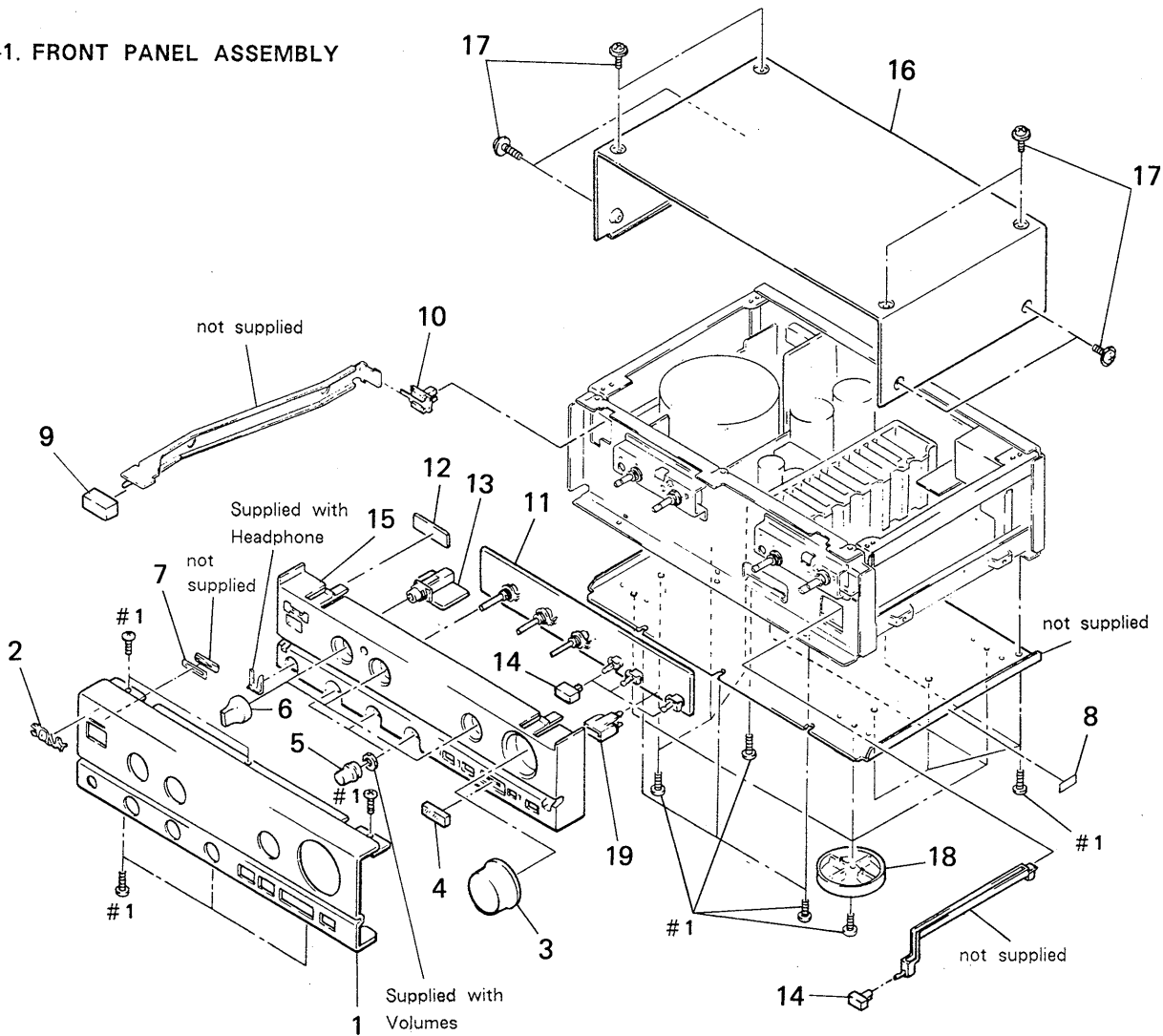
- -XX, -X mean standardized parts, so they may have some differences from the original one.
 - The construction parts of an assembled part are indicated with a collation number in the remark column.
 - Color indication of Appearance Parts
- Example:
- KNOB, BALANCE(WHITE)....(RED)
-
- Parts color
Cabinet's color

- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (#mark) list is given in the last of this parts list.

The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque  sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

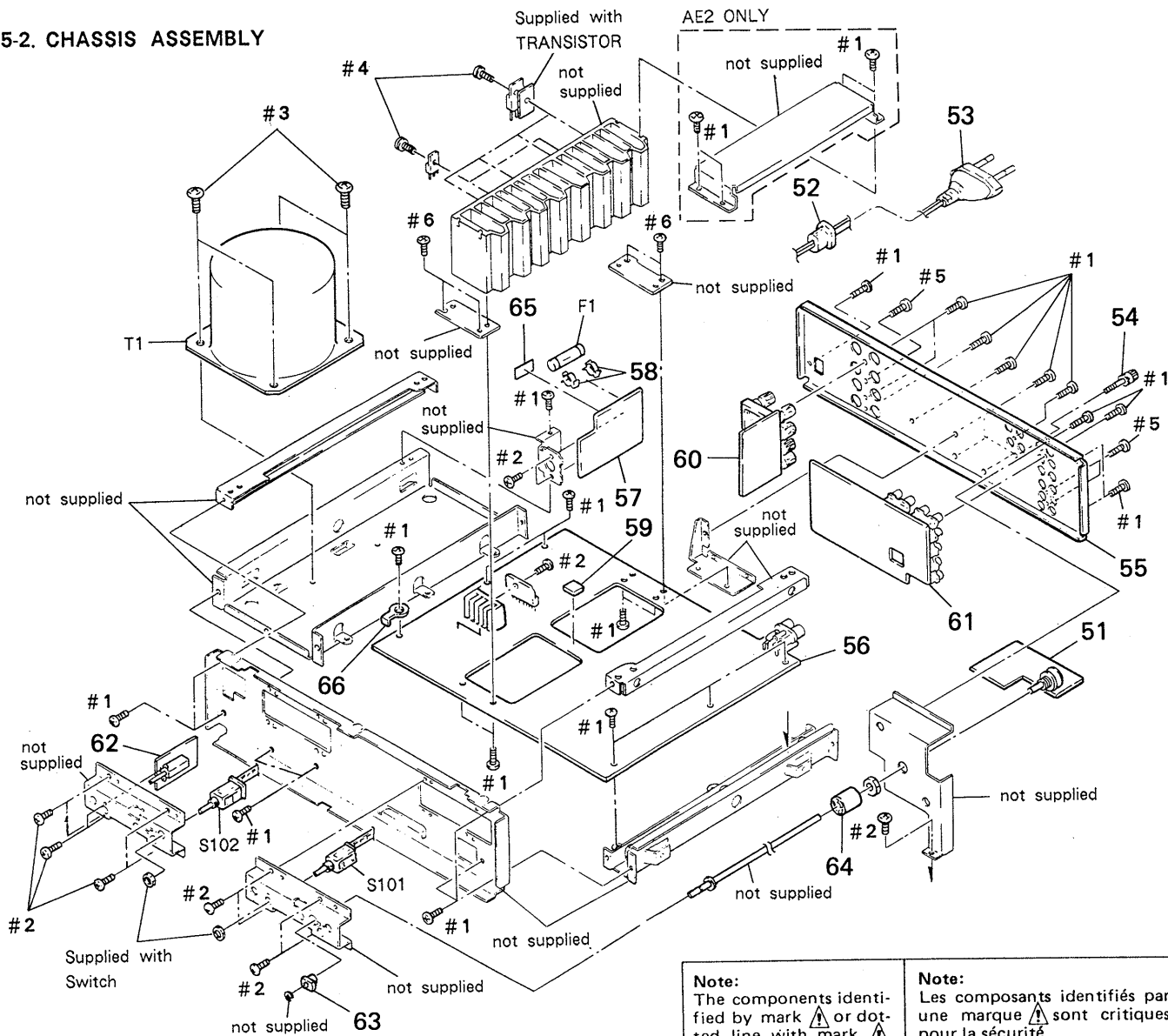
5-1. FRONT PANEL ASSEMBLY



Ref. No.	Part No.	Description	Remark
1	4-945-617-01	PANEL, FRONT	
2	4-908-848-01	EMBLEM, SONY	
3	X-4941-616-1	KNOB (R53) ASSY	
4	4-945-622-01	PLATE (S/D), INDICATION	
5	4-945-600-01	KNOB (R21)	
6	4-945-601-01	KNOB (F25)	
7	4-945-175-01	INDICATOR (PSW)	
8	4-926-836-01	CUSHION (BUTTON)	
9	4-929-289-01	BUTTON	
10	4-875-466-11	JOINT (F2), KNOB	
11	* A-4345-179-A	SD BOARD, COMPLETE (Canadian, AEP)	
11	* A-4345-199-A	SD BOARD, COMPLETE (Germany)	

Ref. No.	Part No.	Description	Remark
12	* 1-639-971-11	LED BOARD	
13	* 1-639-969-11	HP BOARD	
14	4-945-176-01	BUTTON (18X11)	
15	* 4-945-605-01	PANEL (BASE), FRONT	
16	* 4-945-618-01	CASE	
17	3-704-366-01	SCREW (CASE) (M3X8)	
18	X-4941-617-1	FOOT (58175) ASSY	
19	4-945-177-01	HOUSE, LIGHTING	

5-2. CHASSIS ASSEMBLY



Ref. No.	Part No.	Description	Remark
51	* 1-639-963-11	470 VOL BOARD	
52	* 3-703-244-00	BUSHING (2104), CORD	
53	△ 1-575-651-11	CORD, POWER (AEP, Germany)	
53	△ 1-575-975-11	CORD, POWER (Canadian)	
54	3-706-165-00	SCREW	
55	* 4-944-985-01	PANEL, BACK (Canadian)	
55	* 4-944-985-11	PANEL, BACK (AE1)	
55	* 4-944-985-21	PANEL, BACK (AE2)	
55	* 4-944-985-31	PANEL, BACK (Germany)	
56	* A-4345-166-A	MAIN BOARD, COMPLETE (Canadian, AE1)	
56	* A-4345-186-A	MAIN BOARD, COMPLETE (AE2)	
56	* A-4345-188-A	MAIN BOARD, COMPLETE (Germany)	
57	* 1-639-965-11	AC BOARD	
58	1-533-225-11	HOLDER FUSE	
59	4-946-613-11	SPACER (AEP, Germany)	

Ref. No.	Part No.	Description	Remark
-----	-----	-----	-----
60	* 1-639-964-11	SP BOARD	
61	* 1-639-972-11	INPUT BOARD	
62	* 1-639-970-11	SW BOARD	
63	* 4-945-610-01	BEARING, VOL	
64	* 4-945-611-01	JOINT, VR	
65	3-701-947-18	LABEL (T4A), FUSE (AEP, Germany)	
66	4-870-539-00	PLATE, GROUND	
F1	△ 1-532-350-00	FUSE (4.0A) (AEP, Germany)	
F1	△ 1-532-749-11	FUSE, GLASS TUBE (8.0A) (Canadian)	
S101	1-572-796-11	SWITCH, ROTARY SLIDE (REC OUT SELECTOR)	
S102	1-572-795-11	SWITCH, ROTARY SLIDE (INPUT SELECTOR)	
T1	△ 1-450-568-11	TRANSFORMER, POWER (AEP, Germany)	
T1	△ 1-450-588-11	TRANSFORMER, POWER (Canadian)	

SECTION 6

ELECTRICAL PARTS LIST

AC HP INPUT

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- —XX, —X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
All resistors are in ohms
METAL: Metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F: nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
In each case, u: μ , for example:
uA....: μ A...., uPA....: μ PA....
uPB....: μ PB...., uPC....: μ PC....
uPD....: μ PD....
- CAPACITORS
uF: μ F
- COILS
uH: μ H

The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

Ref. No.	Part No.	Description	Remark
	* 1-639-965-11	AC BOARD	

	1-533-225-11	HOLDER, FUSE	
		< CAPACITOR >	
C1	Δ 1-161-741-00	CERAMIC 0.001uF 10% 400V	
		< CONNECTOR >	
CNP1	* 1-568-226-11	PIN, CONNECTOR 2P	
CNP2	* 1-564-321-21	PIN, CONNECTOR 2P	
		< SWITCH >	
S1	Δ 1-554-920-11	SWITCH, PUSH (AC POWER) (1 KEY) (POWER)	

	* 1-639-969-11	HP BOARD	

		< JACK >	
J800	1-507-796-71	JACK (HEADPHONES)	

	* 1-639-972-11	INPUT BOARD	

		< CAPACITOR >	
C151	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C152	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C153	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C154	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C155	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	

Ref. No.	Part No.	Description	Remark
C156	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C157	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C251	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C252	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C253	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C254	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C255	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C256	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
C257	1-162-286-31	CERAMIC 220PF 10% 50V (Germany)	
		< CONNECTOR >	
CNJ100	1-562-087-00	SOCKET, CONNECTOR 4P	
		< JACK >	
J101	* 1-573-142-31	JACK, PIN 4P (TUNER IN/CD IN)	
J102	1-568-978-11	JACK 6P (AUX IN/TAPE 1)	
J103	* 1-573-142-21	JACK, PIN 4P (TAPE 2/DAT)	
		< RESISTOR >	
R115	1-247-713-11	CARBON 1K 5% 1/4W	
R116	1-247-713-11	CARBON 1K 5% 1/4W	
R117	1-246-545-00	CARBON 1.0M 5% 1/4W	
R118	1-246-545-00	CARBON 1.0M 5% 1/4W	
R119	1-246-545-00	CARBON 1.0M 5% 1/4W	
R120	1-246-545-00	CARBON 1.0M 5% 1/4W	
R121	1-246-545-00	CARBON 1.0M 5% 1/4W	
R152	1-247-708-11	CARBON 470 5% 1/4W (Germany)	
R153	1-247-708-11	CARBON 470 5% 1/4W (Germany)	
R154	1-247-708-11	CARBON 470 5% 1/4W (Germany)	
R155	1-247-708-11	CARBON 470 5% 1/4W (Germany)	
R156	1-247-708-11	CARBON 470 5% 1/4W (Germany)	
R215	1-247-713-11	CARBON 1K 5% 1/4W	
R216	1-247-713-11	CARBON 1K 5% 1/4W	
R217	1-246-545-00	CARBON 1.0M 5% 1/4W	

INPUT LED MAIN

Ref. No.	Part No.	Description	Remark		
R218	1-246-545-00	CARBON	1.0M	5%	1/4W
R219	1-246-545-00	CARBON	1.0M	5%	1/4W
R220	1-246-545-00	CARBON	1.0M	5%	1/4W
R221	1-246-545-00	CARBON	1.0M	5%	1/4W
R252	1-247-708-11	CARBON	470	5%	1/4W (Germany)
R253	1-247-708-11	CARBON	470	5%	1/4W (Germany)
R254	1-247-708-11	CARBON	470	5%	1/4W (Germany)
R255	1-247-708-11	CARBON	470	5%	1/4W (Germany)
R256	1-247-708-11	CARBON	470	5%	1/4W (Germany)
< SWITCH >					
S101	1-571-669-11	SWITCH, SLIDE (INPUT SELECTOR)			
S102	1-571-115-11	SWITCH, SLIDE (REC OUT SELECTOR)			

* 1-639-971-11 LED BOARD					

< DIODE >					
D805	8-719-303-02	LED SEL2510C-D (POWER)			
D806	8-719-303-02	LED SEL2510C-D (POWER)			
D807	8-719-303-02	LED SEL2510C-D (POWER)			
D808	8-719-302-23	LED SEL2213C-C (POWER)			

* A-4345-166-A MAIN BOARD, COMPLETE (Canadian, AE1)					
* A-4345-186-A MAIN BOARD, COMPLETE (AE2)					
* A-4345-188-A MAIN BOARD, COMPLETE (Germany)					

4-870-539-00 PLATE, GROUND					
4-946-076-01 SHEET (C), ADHESIVE					
< CAPACITOR >					
C100	1-164-075-11	CERAMIC	150PF	10%	50V
C101	1-123-369-00	ELECT	4.7uF	20%	50V
C102	1-161-375-00	CERAMIC	0.0022uF	30%	50V (Germany)
C102	1-161-377-00	CERAMIC	0.0047uF	30%	50V (Canadian, AEP)
C103	1-130-492-11	MYLAR	0.056uF	5%	50V
C104	1-130-485-00	MYLAR	0.015uF	5%	50V
C105	1-126-059-11	ELECT	10uF	20%	50V
C106	1-126-541-11	ELECT	330uF	20%	16V
C107	1-123-380-00	ELECT	1uF	20%	50V
C150	1-162-284-31	CERAMIC	150PF	10%	50V
C158	1-164-073-11	CERAMIC	100PF	10%	50V
C200	1-164-075-11	CERAMIC	150PF	10%	50V
C201	1-123-369-00	ELECT	4.7uF	20%	50V

Ref. No.	Part No.	Description	Remark		
C202	1-161-375-00	CERAMIC	0.0022uF	30%	50V (Germany)
C202	1-161-377-00	CERAMIC	0.0047uF	30%	50V (Canadian, AEP)
C203	1-130-492-11	MYLAR	0.056uF	5%	50V
C204	1-130-485-00	MYLAR	0.015uF	5%	50V
C205	1-126-059-11	ELECT	10uF	20%	50V
C206	1-126-541-11	ELECT	330uF	20%	16V
C250	1-162-284-31	CERAMIC	150PF	10%	50V
C258	1-164-073-11	CERAMIC	100PF	10%	50V
C500	1-123-369-00	ELECT	4.7uF	20%	50V
C501	1-164-073-11	CERAMIC	100PF	10%	50V
C502	1-164-083-11	CERAMIC	680PF	10%	50V
C503	1-124-477-11	ELECT	47uF	20%	25V
C504	1-102-316-00	CERAMIC	15PF	5%	500V
C505	1-102-943-00	CERAMIC	6.0PF	+0.5PF	50V
C506	1-136-163-00	FILM	0.068uF	5%	50V
C507	1-136-163-00	FILM	0.068uF	5%	50V
C508	1-126-335-11	ELECT	220uF	20%	10V
C509	1-124-130-00	ELECT	100uF	20%	63V
C510	1-123-306-00	ELECT	47uF	20%	10V
C553	1-162-282-31	CERAMIC	100PF	10%	50V (Germany)
C600	1-123-369-00	ELECT	4.7uF	20%	50V
C601	1-164-073-11	CERAMIC	100PF	10%	50V
C602	1-164-083-11	CERAMIC	680PF	10%	50V
C603	1-124-477-11	ELECT	47uF	20%	25V
C604	1-102-316-00	CERAMIC	15PF	5%	500V
C605	1-102-943-00	CERAMIC	6.0PF	+0.5PF	50V
C606	1-136-163-00	FILM	0.068uF	5%	50V
C607	1-136-163-00	FILM	0.068uF	5%	50V
C608	1-126-335-11	ELECT	220uF	20%	10V
C609	1-124-130-00	ELECT	100uF	20%	63V
C610	1-123-306-00	ELECT	47uF	20%	10V
C653	1-162-282-31	CERAMIC	100PF	10%	50V (Germany)
C800	1-164-085-11	CERAMIC	0.001uF	10%	50V
C801	1-124-478-11	ELECT	100uF	20%	25V
C802	1-124-478-11	ELECT	100uF	20%	25V
C803	1-124-918-11	ELECT	47uF	20%	63V
C805	1-124-791-11	ELECT	1.0uF	20%	100V
C806	1-124-919-11	ELECT	220uF	20%	63V
C807	1-124-927-11	ELECT	4.7uF	20%	100V
C808	1-124-925-11	ELECT	2.2uF	20%	100V
C809	1-136-165-00	FILM	0.1uF	5%	50V
C811	1-124-907-11	ELECT	10uF	20%	50V
C900	1-125-684-11	ELECT	10000uF	20%	63V
C901	1-125-684-11	ELECT	10000uF	20%	63V
C902	1-128-358-51	ELECT	2700uF	20%	56V
C903	1-128-358-51	ELECT	2700uF	20%	56V
C904	1-124-918-11	ELECT	47uF	20%	63V

MAIN

Ref. No.	Part No.	Description	Remark
C905	1-124-918-11	ELECT 47uF 20% 63V	
C906	1-124-122-11	ELECT 100uF 20% 50V	
C907	1-124-122-11	ELECT 100uF 20% 50V	
C909	1-106-379-12	MYLAR 0.033uF 5% 200V	
C910	1-106-379-12	MYLAR 0.033uF 5% 200V	
C950	1-162-596-00	CERAMIC 0.022uF 10% 50V (Germany)	
C952	1-162-596-00	CERAMIC 0.022uF 10% 50V (Germany)	
< CONNECTOR >			
CNP700	* 1-564-506-11	PLUG, CONNECTOR 3P	
CNP701	* 1-564-510-11	PLUG, CONNECTOR 7P	
CNP703	* 1-564-515-11	PLUG, CONNECTOR 12P	
CNP704	* 1-564-104-00	PIN, CONNECTOR 3P	
CNP800	* 1-564-339-00	PIN, CONNECTOR 5P	
CNP801	* 1-564-341-11	PIN, CONNECTOR 7P	
CNP803	* 1-564-340-00	PIN, CONNECTOR 6P	
CNP804	* 1-564-337-00	PIN, CONNECTOR 3P	
< DIODE >			
D100	8-719-933-50	DIODE HZS7C2L	
D500	8-719-912-20	DIODE 1SS120	
D501	8-719-933-36	DIODE HZS6B1L	
D502	8-719-912-20	DIODE 1SS120	
D503	8-719-912-20	DIODE 1SS120	
D504	8-719-912-20	DIODE 1SS120	
D505	8-719-912-20	DIODE 1SS120	
D506	8-719-912-20	DIODE 1SS120	
D515	8-719-815-85	DIODE 1S1585	
D516	8-719-815-85	DIODE 1S1585	
D517	8-719-912-20	DIODE 1SS120	
D600	8-719-912-20	DIODE 1SS120	
D601	8-719-933-36	DIODE HZS6B1L	
D602	8-719-912-20	DIODE 1SS120	
D603	8-719-912-20	DIODE 1SS120	
D604	8-719-912-20	DIODE 1SS120	
D605	8-719-912-20	DIODE 1SS120	
D606	8-719-912-20	DIODE 1SS120	
D615	8-719-815-85	DIODE 1S1585	
D616	8-719-815-85	DIODE 1S1585	
D617	8-719-912-20	DIODE 1SS120	
D800	8-719-200-82	DIODE 11ES2	
D801	8-719-200-82	DIODE 11ES2	
D802	8-719-200-82	DIODE 11ES2	
D803	8-719-912-20	DIODE 1SS120	
D804	8-719-912-20	DIODE 1SS120	
D815	8-719-912-20	DIODE 1SS120	
D900	8-719-302-38	DIODE RBV-602-01	
D901	8-719-200-82	DIODE 11ES2	
D902	8-719-200-82	DIODE 11ES2	

Ref. No.	Part No.	Description	Remark
D903	8-719-200-82	DIODE 11ES2	
D904	8-719-200-82	DIODE 11ES2	
< IC >			
IC100	8-759-981-98	IC RC4560DD	
IC800	8-759-111-68	IC uPC1237HA	
IC900	8-759-231-59	IC TA7815S	
IC901	8-759-245-87	IC TA7915S	
< JACK >			
J100	* 1-573-140-21	JACK, PIN 2P (PHONO IN)	
< COIL >			
L100	1-424-397-11	COIL, CHOKE 200uH (Germany)	
L101	1-424-397-11	COIL, CHOKE 200uH (Germany)	
L200	1-424-397-11	COIL, CHOKE 200uH (Germany)	
L201	1-424-397-11	COIL, CHOKE 200uH (Germany)	
L500	1-428-133-13	COIL, AIR-CORE	
L600	1-428-133-13	COIL, AIR-CORE	
< TRANSISTOR >			
Q100	8-729-354-52	TRANSISTOR 2SC2545-E	
Q101	8-729-354-52	TRANSISTOR 2SC2545-E	
Q200	8-729-354-52	TRANSISTOR 2SC2545-E	
Q201	8-729-354-52	TRANSISTOR 2SC2545-E	
Q500	8-729-620-17	TRANSISTOR 2SC2259-FG	
Q501	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q502	8-729-140-84	TRANSISTOR 2SC1841-PAFAEA	
Q503	8-729-224-62	TRANSISTOR 2SK246GR	
Q504	8-729-108-14	TRANSISTOR 2SA988-FA	
Q505	8-729-803-76	TRANSISTOR 2SA1371-E	
Q506	8-729-142-01	TRANSISTOR 2SC1941-LK	
Q507	8-729-209-15	TRANSISTOR 2SD2012	
Q508	8-729-141-46	TRANSISTOR 2SC4431-LK	
Q509	8-729-141-37	TRANSISTOR 2SA1684-LK	
Q510	8-729-320-71	TRANSISTOR 2SC3856-OY	
Q511	8-729-320-72	TRANSISTOR 2SA1492-OY	
Q512	8-729-104-14	TRANSISTOR 2SA988-FA	
Q600	8-729-620-17	TRANSISTOR 2SC2259-FG	
Q601	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q602	8-729-140-84	TRANSISTOR 2SC1841-PAFAEA	
Q603	8-729-224-62	TRANSISTOR 2SK246GR	
Q604	8-729-108-14	TRANSISTOR 2SA988-FA	
Q605	8-729-803-76	TRANSISTOR 2SA1371-E	
Q606	8-729-142-01	TRANSISTOR 2SC1941-LK	
Q607	8-729-209-15	TRANSISTOR 2SD2012	

MAIN

Ref. No.	Part No.	Description	Remark
Q608	8-729-141-46	TRANSISTOR 2SC4431-LK	
Q609	8-729-141-37	TRANSISTOR 2SA1684-LK	
Q610	8-729-320-71	TRANSISTOR 2SC3856-0Y	
Q611	8-729-320-72	TRANSISTOR 2SA1492-0Y	
Q612	8-729-108-14	TRANSISTOR 2SA988-FA	
Q800	8-729-140-96	TRANSISTOR 2SD774-34	
Q801	8-729-194-57	TRANSISTOR 2SC945-P	
Q802	8-729-900-63	TRANSISTOR DTA124ES	
Q803	8-729-900-63	TRANSISTOR DTA124ES	
< RESISTOR >			
R100	1-247-700-11	CARBON 100 5% 1/4W	
R101	1-249-469-11	CARBON 100K 5% 1/4W	
R102	1-247-706-11	CARBON 330 5% 1/4W	
R103	1-249-469-11	CARBON 100K 5% 1/4W	
R104	1-247-725-11	CARBON 10K 5% 1/4W	
R105	1-247-700-11	CARBON 100 5% 1/4W(Canadian, AEP)	
R105	1-247-702-11	CARBON 150 5% 1/4W(Germany)	
R106	1-247-710-11	CARBON 560 5% 1/4W	
R107	1-247-710-11	CARBON 560 5% 1/4W	
R108	1-247-716-11	CARBON 1.8K 5% 1/4W	
R109	1-249-457-11	CARBON 6.8 5% 1/4W	
R110	1-247-700-11	CARBON 100 5% 1/4W	
R111	1-246-545-00	CARBON 1.0M 5% 1/4W	
R112	1-249-844-11	CARBON 56K 1% 1/2W	
R113	1-249-818-11	CARBON 4.7K 1% 1/2W	
R114	1-247-704-11	CARBON 220 5% 1/4W	
R150	1-259-428-11	CARBON 1K 5% 1/6W(Germany)	
R151	1-259-428-11	CARBON 1K 5% 1/6W(Germany)	
R200	1-247-700-11	CARBON 100 5% 1/4W	
R201	1-249-469-11	CARBON 100K 5% 1/4W	
R202	1-247-706-11	CARBON 330 5% 1/4W	
R203	1-249-469-11	CARBON 100K 5% 1/4W	
R204	1-247-725-11	CARBON 10K 5% 1/4W	
R205	1-247-700-11	CARBON 100 5% 1/4W(Canadian, AEP)	
R205	1-247-702-11	CARBON 150 5% 1/4W(Germany)	
R206	1-247-710-11	CARBON 560 5% 1/4W	
R207	1-247-710-11	CARBON 560 5% 1/4W	
R209	1-249-457-11	CARBON 6.8 5% 1/4W	
R210	1-247-700-11	CARBON 100 5% 1/4W	
R211	1-246-545-00	CARBON 1.0M 5% 1/4W	
R212	1-249-844-11	CARBON 56K 1% 1/2W	
R213	1-249-818-11	CARBON 4.7K 1% 1/2W	
R214	1-247-704-11	CARBON 220 5% 1/4W	
R250	1-259-428-11	CARBON 1K 5% 1/6W(Germany)	
R251	1-259-428-11	CARBON 1K 5% 1/6W(Germany)	
R500	1-247-713-11	CARBON 1K 5% 1/4W	
R501	1-249-469-11	CARBON 100K 5% 1/4W	

Ref. No.	Part No.	Description	Remark
R502	1-247-704-11	CARBON 220 5% 1/4W	
R503	1-247-717-11	CARBON 2.2K 5% 1/4W	
R504	1-247-704-11	CARBON 220 5% 1/4W	
R505	1-247-704-11	CARBON 220 5% 1/4W	
R506	1-247-704-11	CARBON 220 5% 1/4W	
R507	1-249-463-11	CARBON 27K 5% 1/4W	
R508	1-247-721-11	CARBON 4.7K 5% 1/4W	
R509	1-247-694-11	CARBON 33 5% 1/4W	
R510	1-247-698-11	CARBON 68 5% 1/4W	
R511	1-247-717-11	CARBON 2.2K 5% 1/4W	
R512	1-247-713-11	CARBON 1K 5% 1/4W	
R513	1-249-915-11	CARBON 470 1% 1/4W	
R514	△ 1-247-688-11	CARBON 10 5% 1/4W F	
R515	△ 1-247-688-11	CARBON 10 5% 1/4W F	
R516	1-249-469-11	CARBON 100K 5% 1/4W	
R517	△ 1-247-745-11	CARBON 330 5% 1/2W F	
R518	△ 1-249-455-11	CARBON 4.7 5% 1/4W F	
R519	△ 1-249-455-11	CARBON 4.7 5% 1/4W F	
R520	1-217-611-00	RES, METAL PLATE 0.1	
R521	1-217-611-00	RES, METAL PLATE 0.1	
R522	1-247-727-11	CARBON 10 5% 1/2W	
R523	△ 1-247-717-11	CARBON 2.2K 5% 1/4W F	
R524	1-249-460-11	CARBON 15K 5% 1/4W	
R525	1-247-887-00	CARBON 220K 5% 1/4W	
R526	1-247-727-11	CARBON 10 5% 1/2W	
R527	1-247-750-11	CARBON 680 5% 1/2W	
R552	1-249-393-11	CARBON 10 5% 1/4W(Germany)	
R600	1-247-713-11	CARBON 1K 5% 1/4W	
R601	1-249-469-11	CARBON 100K 5% 1/4W	
R602	1-247-704-11	CARBON 220 5% 1/4W	
R603	1-247-717-11	CARBON 2.2K 5% 1/4W	
R604	1-247-704-11	CARBON 220 5% 1/4W	
R605	1-247-704-11	CARBON 220 5% 1/4W	
R606	1-247-704-11	CARBON 220 5% 1/4W	
R607	1-249-463-11	CARBON 27K 5% 1/4W	
R608	1-247-721-11	CARBON 4.7K 5% 1/4W	
R609	1-247-694-11	CARBON 33 5% 1/4W	
R610	1-247-698-11	CARBON 68 5% 1/4W	
R611	1-247-717-11	CARBON 2.2K 5% 1/4W	
R612	1-247-713-11	CARBON 1K 5% 1/4W	
R613	1-249-915-11	CARBON 470 1% 1/4W	
R614	△ 1-247-688-11	CARBON 10 5% 1/4W F	
R615	△ 1-247-688-11	CARBON 10 5% 1/4W F	
R616	1-249-469-11	CARBON 100K 5% 1/4W	
R617	△ 1-247-745-11	CARBON 330 5% 1/2W F	
R618	△ 1-249-455-11	CARBON 4.7 5% 1/4W F	
R619	△ 1-249-455-11	CARBON 4.7 5% 1/4W F	
R620	1-217-611-00	RES, METAL PLATE 0.1	
R621	1-217-611-00	RES, METAL PLATE 0.1	

Note:
The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Note:
Les composants identifiés par une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

MAIN SD

Ref. No.	Part No.	Description	Remark		
R622	1-247-727-11	CARBON	10	5%	1/2W
R623	Δ 1-247-717-11	CARBON	2.2K	5%	1/4W F
R624	1-249-460-11	CARBON	15K	5%	1/4W
R625	1-247-887-00	CARBON	220K	5%	1/4W
R626	1-247-727-11	CARBON	10	5%	1/2W
R627	1-247-750-11	CARBON	680	5%	1/2W
R652	1-249-393-11	CARBON	10	5%	1/4W (Germany)
R801	1-247-887-00	CARBON	220K	5%	1/4W
R802	1-247-881-00	CARBON	120K	5%	1/4W
R803	1-249-461-11	CARBON	18K	5%	1/4W
R804	1-247-721-11	CARBON	4.7K	5%	1/4W
R805	1-247-693-11	CARBON	27	5%	1/4W
R806	1-247-721-11	CARBON	4.7K	5%	1/4W
R807	1-247-751-11	CARBON	820	5%	1/2W
R808	1-249-467-11	CARBON	68K	5%	1/4W
R810	1-247-237-00	CARBON	750	5%	1/2W
R812	1-247-740-11	CARBON	120	5%	1/2W
R820	1-247-725-11	CARBON	10K	5%	1/4W
R821	1-247-699-11	CARBON	82	5%	1/4W
R900	1-247-753-11	CARBON	1.2K	5%	1/2W
R901	1-247-753-11	CARBON	1.2K	5%	1/2W
R902	1-247-753-11	CARBON	1.2K	5%	1/2W
R903	1-247-753-11	CARBON	1.2K	5%	1/2W
R904	1-247-753-11	CARBON	1.2K	5%	1/2W
R905	1-247-753-11	CARBON	1.2K	5%	1/2W
R906	1-247-753-11	CARBON	1.2K	5%	1/2W
R907	1-247-753-11	CARBON	1.2K	5%	1/2W
R910	1-806-882-11	THERMISTOR (POSITIVE)	2.2	(Canadian, AEP)	
R911	1-806-882-11	THERMISTOR (POSITIVE)	2.2	(Canadian, AEP)	
< VARIABLE RESISTOR >					
RV500	1-237-455-11	RES. ADJ. CARBON 500	(BIAS CURRENT L)		
RV600	1-237-455-11	RES. ADJ. CARBON 500	(BIAS CURRENT R)		
< RELAY >					
RY802	1-515-787-21	RELAY			
< SWITCH >					
S100	1-571-111-11	SWITCH, PUSH (1 KEY)	(CATRIDGE)		

* A-4345-199-A SD BOARD, COMPLETE (Germany)					
* A-4345-179-A SD BOARD, COMPLETE (Canadian, AEP)					

4-945-177-01 HOUSE, LIGHTING (Canadian, AEP)					

Ref. No.	Part No.	Description	Remark		
< CAPACITOR >					
C300	1-123-369-00	ELECT	4.7uF	20%	50V
C302	1-136-154-00	FILM	0.012uF	5%	50V
C303	1-136-154-00	FILM	0.012uF	5%	50V
C304	1-130-473-00	MYLAR	0.0015uF	5%	50V
C305	1-164-073-11	CERAMIC	100PF	10%	50V
C306	1-123-369-00	ELECT	4.7uF	20%	50V
C307	1-136-166-00	FILM	0.12uF	5%	50V
C308	1-162-286-31	CERAMIC	220PF	10%	50V
C309	1-136-161-00	FILM	0.047uF	5%	50V
C310	1-164-062-11	CERAMIC	47PF	5%	50V
C312	1-164-031-11	CERAMIC	33PF	5%	50V (Germany)
C400	1-123-369-00	ELECT	4.7uF	20%	50V
C402	1-136-154-00	FILM	0.012uF	5%	50V
C403	1-136-154-00	FILM	0.012uF	5%	50V
C404	1-130-473-00	MYLAR	0.0015uF	5%	50V
C405	1-164-073-11	CERAMIC	100PF	10%	50V
C406	1-123-369-00	ELECT	4.7uF	20%	50V
C407	1-136-166-00	FILM	0.12uF	5%	50V
C408	1-162-286-31	CERAMIC	220PF	10%	50V
C409	1-136-161-00	FILM	0.047uF	5%	50V
C410	1-164-062-11	CERAMIC	47PF	5%	50V
C412	1-164-031-11	CERAMIC	33PF	5%	50V (Germany)
C810	1-126-233-11	ELECT	22uF	20%	50V
< DIODE >					
D300	8-719-912-20	DIODE 1SS120			
D400	8-719-912-20	DIODE 1SS120			
D809	8-719-301-52	LED SEL2810A-C (DIRECT)			
D810	8-719-301-52	LED SEL2810A-C (DIRECT)			
< IC >					
IC300	8-759-634-50	IC M5218AL			
IC301	8-759-634-50	IC M5218AL			
< RESISTOR >					
R300	1-247-725-11	CARBON	10K	5%	1/4W
R301	1-247-725-11	CARBON	10K	5%	1/4W
R302	1-246-545-00	CARBON	1.0M	5%	1/4W
R303	1-247-700-11	CARBON	100	5%	1/4W
R304	1-247-726-11	CARBON	33K	5%	1/4W
R305	1-247-726-11	CARBON	33K	5%	1/4W
R306	1-247-724-11	CARBON	8.2K	5%	1/4W
R309	1-247-706-11	CARBON	330	5%	1/4W
R310	1-246-545-00	CARBON	1.0M	5%	1/4W
R311	1-247-725-11	CARBON	10K	5%	1/4W

Note:
The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Note:
Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

SD

SP

SW

470 VOL

Ref. No.	Part No.	Description	Remark		
R312	1-247-725-11	CARBON	10K	5%	1/4W
R314	1-246-545-00	CARBON	1.0M	5%	1/4W
R400	1-247-725-11	CARBON	10K	5%	1/4W
R401	1-247-725-11	CARBON	10K	5%	1/4W
R402	1-246-545-00	CARBON	1.0M	5%	1/4W
R403	1-247-700-11	CARBON	100	5%	1/4W
R404	1-247-726-11	CARBON	33K	5%	1/4W
R405	1-247-726-11	CARBON	33K	5%	1/4W
R406	1-247-724-11	CARBON	8.2K	5%	1/4W
R409	1-247-706-11	CARBON	330	5%	1/4W
R410	1-246-545-00	CARBON	1.0M	5%	1/4W
R411	1-247-725-11	CARBON	10K	5%	1/4W
R412	1-247-725-11	CARBON	10K	5%	1/4W
R414	1-246-545-00	CARBON	1.0M	5%	1/4W
< VARIABLE RESISTOR >					
RV300	1-241-056-11	RES. VAR. CARBON 100K/100K (TREBLE)			
RV301	1-241-056-11	RES. VAR. CARBON 100K/100K (BASS)			
RV302	1-238-513-11	RES. VAR. CARBON 150K/150K (BALANCE)			
< SWITCH >					
S300	1-571-112-21	SWITCH. PUSH (1 KEY) (SUBSONIC)			
S301	1-571-112-21	SWITCH. PUSH (1 KEY) (LOUDNESS)			
S302	1-572-642-11	SWITCH. PUSH (1 KEY) (SOURCE DIRECT)			

* 1-639-964-11 SP BOARD					

< CAPACITOR >					
C550	1-136-161-00	FILM 0.047uF	5%	50V (Germany)	
C551	1-136-161-00	FILM 0.047uF	5%	50V (Germany)	
C552	1-164-079-11	CERAMIC 330PF	10%	50V (Germany)	
C650	1-136-161-00	FILM 0.047uF	5%	50V (Germany)	
C651	1-136-161-00	FILM 0.047uF	5%	50V (Germany)	
C652	1-164-079-11	CERAMIC 330PF	10%	50V (Germany)	
< CONNECTOR >					
CNP702 * 1-564-509-11 PLUG, CONNECTOR 6P					
< DIODE >					
D811	8-719-912-20	DIODE 1SS120			
D812	8-719-912-20	DIODE 1SS120			
D813	8-719-912-20	DIODE 1SS120			
D814	8-719-912-20	DIODE 1SS120			

Ref. No.	Part No.	Description	Remark		
< RESISTOR >					
R550	1-247-482-11	CARBON 4.7	5%	1/2W	(Germany)
R551	1-247-482-11	CARBON 4.7	5%	1/2W	(Germany)
R650	1-247-482-11	CARBON 4.7	5%	1/2W	(Germany)
R651	1-247-482-11	CARBON 4.7	5%	1/2W	(Germany)
< RELAY >					
RY800	1-515-501-00	RELAY			
RY801	1-515-501-00	RELAY			
< TERMINAL >					
TM900	1-537-227-11	TERMINAL BOARD (SPEAKER) (AE2)			
TM900	1-537-228-11	TERMINAL BOARD (SPEAKER) (EXCEPT AE2)			

* 1-639-970-11 SW BOARD					

< CONNECTOR >					
CNP706 * 1-564-508-11 PLUG, CONNECTOR 5P					
< RESISTOR >					
R813	1-247-756-11	CARBON 2.2K	5%	1/2W	
R814	1-247-756-11	CARBON 2.2K	5%	1/2W	
R815	1-247-756-11	CARBON 2.2K	5%	1/2W	
R816	1-247-756-11	CARBON 2.2K	5%	1/2W	
R817	1-247-756-11	CARBON 2.2K	5%	1/2W	
R818	1-247-756-11	CARBON 2.2K	5%	1/2W	
< SWITCH >					
S900	1-572-797-11	SWITCH, ROTARY SLIDE (SPEAKER)			

* 1-639-963-11 470 VOL BOARD					

< CAPACITOR >					
C804	1-136-165-00	FILM 0.1uF	5%	50V	
< CONNECTOR >					
CNP100	1-560-941-00	PIN, CONNECTOR 4P			
< DIODE >					
D816	8-719-912-20	DIODE 1SS120			

470 VOL

Ref. No.	Part No.	Description	Remark
< TRANSISTOR >			
Q804	8-729-620-05	TRANSISTOR 2SC2603-EF	
< RESISTOR >			
R819	1-249-425-11	CARBON 4.7K 5% 1/4W	
< VARIABLE RESISTOR >			
RV303	1-241-557-11	RES. VAR. CARBON 120K/120K (VOLUME)	
< RELAY >			
RY300	1-515-787-21	RELAY	

MISCELLANEOUS			

53	△ 1-575-651-11	CORD, POWER (AEP, Germany)	
53	△ 1-575-975-11	CORD, POWER (Canadian)	
F1	△ 1-532-350-00	FUSE (4.0A) (AEP, Germany)	
F1	△ 1-532-749-11	FUSE, GLASS TUBE (8.0A) (Canadian)	
S101	1-572-796-11	SWITCH, ROTARY SLIDE (REC OUT SELECTOR)	
S102	1-572-795-11	SWITCH, ROTARY SLIDE (INPUT SELECTOR)	
T1	△ 1-450-568-11	TRANSFORMER, POWER (AE1, AE2, Germany)	
T1	△ 1-450-588-11	TRANSFORMER, POWER (Canadian)	

ACCESSORY & PACKING MATERIAL			

3-753-389-11 MANUAL, INSTRUCTION (ENGLISH, FRENCH, SPANISH, PORTUGUESE) (Canadian, AEP)			
3-753-389-41 MANUAL, INSTRUCTION (GERMAN, DUTCH, SWEDISH, ITALIAN) (AEP, Germany)			
* 4-931-985-01 CUSHION			
* 4-944-053-01 INDIVIDUAL CARTON			

HARDWARE LIST			

# 1	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3	
# 2	7-682-547-04	SCREW +BVTT 3X6 (S)	
# 3	7-682-560-04	SCREW +BVTT 4X6 (S)	
# 4	7-682-549-04	SCREW +BVTT 3X10 (S)	
# 5	7-621-849-00	SCREW (BV/RING)	
# 6	7-685-647-79	SCREW +BVTP 3X10 TYPE2 IT-3	

Note:

The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par une marque △ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

